NORTHWEST MICHIGAN INVASIVE SPECIES NETWORK

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Garlic Mustard Disposal Options

Disposal Method	Pros	Cons
Composting--NOT RECOMMENDED Establishing an invasive species compost facility. Backyard composting WON'T work.	No chemicals	Very difficult to kill seeds • If 140° F is not reached, the seeds won't be killed; it's extremely hard to reach this temperature
	No landfill	Training/ labor
		Space • Area required for composting
Tarping/Solarizing--Large populations Pile pulled plants in a specific location and cover the pile with heavy-duty tarp for a few years to smother the plants.	Less spread to other locations • Seeds are not at risk to spread to new areas	Seed sprouting on-site • Garlic mustard may sprout in the immediate area; easily contained
	Cheap • One-time cost for tarp	Unsightly • Large, tarp-covered pile can be an eyesore
	No landfill	Space • Area required; preferably space out of view, but close to/on site
	No chemicals	Time • Must be monitored for <u>years</u> after
Landfill--Small populations Appropriately bag garlic mustard for pick-up OR fund a dumpster for garlic mustard-only drop-off.	No chemicals	Cost • Rental and pickup, staffing/monitoring
	Easy	Space • Need a place to put the dumpster
		Abuse • People may put non-garlic mustard waste in the dumpster if unmanned
		Waste • Adds to landfill volume
		Seed transport • Seeds may move in transport or may germinate in landfill
Livestock feed--When possible Feed fresh garlic mustard to local livestock.	No landfill	Availability • Not everyone has animals
	No chemicals	Seed spread • Seeds may move in transport or may germinate at farm
	Cheap • Minimal cost for transport	Quality • Care must be taken to ensure good quality (fresh) plants are fed
	Feed • Fresh greens to livestock early in the season when they are scarce	Livestock impacts • Cannot be fed to dairy animals (will flavor milk), may cause flavor change in meat
Human Consumption--When possible Garlic mustard is edible	No landfill	Quality • Must be picked early and handled gently for best flavor
	No chemicals	Volume • Difficult to use the entire amount
	Useful output • Food	Taste • Not everyone likes garlic mustard

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COMPOSTING

NOT RECOMMENDED

There has been much interest in disposing of garlic mustard and other invasive species in ways that avoid landfills. Composting is an attractive option on the surface, as it creates a useable resource. However, composting garlic mustard is not as easy as it first appears and may actually cause it to spread.

Household compost piles and bins do not reach high enough temperatures to kill garlic mustard seeds. Jason Frenzel, of the Huron River Watershed Council and formerly with the City of Ann Arbor, was in charge of a review of composting invasives. He notes that compost temperature "is very contingent on many specifics: aeration, temp, moisture, time, mixing, etc. …It is really easy to not get complete composting. Backyard composting of invasives is a BAD idea." If the seeds are not killed, garlic mustard will spread each time the compost is used. In fact, heat-hardy invasives like Japanese knotweed may never be truly destroyed by composting.

These problems of incomplete composting and seed dispersal persist for municipal compost piles. Even when appropriate aeration regimes are in place, most municipal composts are not carefully monitored for complete composting, leaving much room for error. Since the compost is often distributed and used throughout a large area, seeds lying dormant in the compost could then sprout in new places—evidence of this has already been seen in northwest Michigan. Ann Arbor, Michigan is one of a very few (carefully-maintained) composts found to be lethal to garlic mustard seeds.

Composting Establishing an invasive species compost facility. Backyard composting **WON'T** work.		
Pros	**Cons**	
No chemicals	Very difficult	If 140° F is not reached, the seeds wont' be killed; hard to reach this temperature
No landfill	Training/ labor	Both required for proper composting
	Space	Area required for composting

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TARPING/SOLARIZING

RECOMMENDED FOR LARGE POPULATIONS

The principle of tarping is similar to composting. Garlic mustard plants are pulled and collected in a single location. When all pulling is complete, the pile of invasives is covered with a securely fastened heavy-duty tarp. The pile is the left alone for the year, except for monitoring the pile for new sprouts. Additional plants can be added at any time, including in later seasons and years, though the tarp must always be carefully replaced and refastened.

Location is key for tarping. The pile should be placed close to/on the site of the infestation to minimize spreading seeds in transport. Ideally, the pile would be in a non-sensitive area that is not readily visible from roads, trails, or other areas that people frequent, as it may be considered an eyesore. A few smaller tarped piles may be necessary to remain inconspicuous and within invaded areas.

Tarping requires annual monitoring for several years after the last plants are added. The tarp keeps plants from being moved and helps raise the temperature, but seeds will escape and sprout. The goal of tarping is to kill the plants and keep seeds in as concentrated an area as possible to make for easy future treatment.

One similar alternative to tarping is called "solarizing." Instead of being piled, plants are placed in black, heavy-duty, contractor-strength garbage bags, tied off, then left in a place that gets plenty of hot summer sun for the year. The high temperatures achieved with the black plastic in the sun will kill garlic mustard seeds after 1 to 2 summers (depending on temperature); at this point the decomposing matter can be added to a compost pile. Monitoring areas where the bags sit and where regular composting is spread is still key.

Tarping/Solarizing

Pile pulled plants in a specific location, and cover the pile with heavy-duty tarp for a few years to smother the plants.

Pros		**Cons**	
Less spread to other locations	Seeds are not at risk to spread to new areas	Seed sprouting on-site	Garlic mustard will sprout in the immediate area; easily contained
Cheap	One-time cost for tarp	Unsightly	Large, tarp-covered pile can be an eyesore
No landfill		Space	Area required; preferably space out of view, but close to/on site
No chemicals		Time	Must be monitored for years after

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LANDFILL

RECOMMENDED FOR SMALL POPULATIONS

In 1994, legislation was passed to exclude compostable items from landfills, but exceptions were made for yard waste that is "diseased, infested, or composed of invasive species" (Michigan Natural Resources and Environmental Protection Act of 1994, §11514.4). This allows landowners to dispose of invasives they remove—such as garlic mustard—using the trash disposal system.

One option is for a city, village, township, or group to rent a dumpster from a disposal service for garlic mustard disposal. However, details concerning location, pickup schedule, monitoring for proper use, and funding should all be carefully considered during planning.

Individual disposal is also an option. For persons using Republic (or Allied before 2009), garlic mustard will be accepted if it is securely bagged. Bags do not need to be labeled with invasive plant stickers. Persons served by American Waste should double-bag and label the bags as invasive plants and drop them off at locations in Traverse City, Kalkasa, or Charlevoix. Customers will be required to pay for their extra bags in both cases.

Regardless of your trash service, please keep in mind that the fees for picking up bags differ depending on where you live. For the most accurate information, please call your trash collector:
Republic (231) 723-4940
American Waste (231) 378-4657
Waste Management (866) 797-9018

Landfill Appropriately bag garlic mustard for pick-up **OR** fund a dumpster for garlic mustard-only drop-off.		
Pros	**Cons**	
No chemicals	Cost	Rental and pickup, staffing/monitoring
Easy	Space	Need a place to put the dumpster
	Abuse	People may put non-garlic mustard waste in the dumpster
	Waste	Adding to landfills
	Seed transport	Seeds may move in transport, may germinate in landfill

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Garlic Mustard Disposal Options

HUMAN CONSUMPTION

RECOMMENDED WHEN POSSIBLE

The fact that garlic mustard is edible is the main reason it is in North America to begin with. Garlic mustard has a flavor similar to garlicky spinach and can be used as a salad green, sautee component, or even a pesto base. Many recipes can be found online; one is included below.

Generally speaking, garlic mustard is more tasty when it is young. It is mildest and has the most pleasing garlic flavor when it is still a rosette. More "bite" develops as the plant begins to bolt. Garlic mustard becomes bitter—unpalatable to some—once it flowers. This progression is advantageous for conservation of native habitats, as pulling garlic mustard is most effective early in the growing season.

Human Consumption

Garlic mustard is edible

Pros		Cons	
Useful output	Food	Quality	Must be picked early & handled gently for best taste
No chemicals		Volume	Difficult to use the entire amount
No landfill		Taste	Not everyone likes garlic mustard

Garlic Mustard Pesto (recipe from http://www.monchesfarm.com/PESTO.htm)

- 3 cups garlic mustard leaves, washed, patted dry, and packed in a measuring cup
- 2 large garlic cloves, peeled & chopped
- 1 cup walnuts
- 1 cup olive oil
- 1 cup grated Parmesan cheese
- 1/4 cup grated Romano cheese (or more Parmesan)
- Salt & pepper to taste

Combine garlic mustard leaves, garlic and walnuts in food processor or blender and chop. With motor running, add olive oil slowly. Shut off motor; add cheeses, salt & pepper. Process briefly to combine. Serve warm over pasta or spread on crackers as an appetizer. It also makes a great topping for baked fish.

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LIVESTOCK FEED

RECOMMENDED WHEN POSSIBLE

Garlic mustard is also possible to feed to livestock, allowing it to be used in a productive manner at a faster rate than humans can consume it. If you have your own animals, consider adding garlic mustard to their early spring diet. Garlic mustard is green before anything else, supplying the animals with vitamins very early in the season. If you don't own livestock, consider teaming up with a local farmer to bring their animals garlic mustard to eat.

Some animals are better suited for garlic mustard consumption than others. Animals with delicate digestion, like horses, should not be fed garlic mustard. Others, like dairy cows, are not affected themselves, but there are reports of garlic mustard giving their milk an unpleasant flavor. Animals raised for their meat might experience a change in flavor, though if they are not fed garlic mustard for a few weeks before market it should not be a problem. Chicken eggs are not reported to be flavored by garlic mustard, and animals raised for fiber show no ill effects.

When transporting garlic mustard to animals, it is crucial to do so before the plants are flowering, to reduce the chance of spreading seeds. Garlic mustard has stores of energy that can allow it to flower and seed out even after being pulled. Additionally, great care must be taken to ensure that the garlic mustard fed to livestock is fresh. Never feed animals more than can be eaten in a day.

Livestock feed Feed fresh garlic mustard to local livestock.			
Pros		**Cons**	
Cheap	Minimal cost for transport	Availability	Not everyone has animals to feed
Feed	Fresh greens to livestock early in the season when they are scarce	Seed spread	Seeds may move in transport, may germinate at farm
No chemicals		Quality	Care must be taken to ensure good quality (fresh) plants are fed
No landfill		Livestock impacts	Cannot be fed to dairy animals (will flavor milk), May cause flavor change in meat